

Phase Transitions and Molecular Conformations in Mesogenic Media

V. Pogorelov, V. Bukalo, and Yu. Astashkin

Department of Physics

Kiev Taras Shevchenko University

Kiev 03022, Ukraine

The aim of the proposed work is to analyze molecular-conformational mechanisms of the phase transitions in mesomorphous media. We have investigated samples can form nematic, smectic, stable and metastable crystal phases. The materials are molecules with a benzilidenaniline core (N-p-methoxybenzylidene p-n-butylaniline (MBBA), aminoxybenzylidene and p-n-butyltoluidine (ABT):

The development of phase transitions under the slow heating of the samples after their fast ("shock") cooling was studied.

Heating of the supercooled nematic samples allows one to investigate the mechanism of relaxation processes in thermodynamic non-equilibrium states in mesogenic media. Results of such a study are reported.

It was carried out the analogous investigations after slow cooling of the chosen samples. In this case we have found the conformational composition of the samples for thermodynamic equilibrium crystal, liquid crystal and liquid states. We have heated the samples in both cycles of heating ("shock" and slow) under it obligatory annealing on each of temperature points. The investigations had been carried out allowed us to establish the molecular conformational composition in the different phases of studied mesogenic substances.